

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference DGC 0213618741	<div style="display: flex; justify-content: space-between;"> FOR FURTHER ACTION See Form PCT/IPEA/416 </div>	
International application No. PCT/AU2004/000329	International filing date (<i>day/month/year</i>) 17 March 2004	Priority date (<i>day/month/year</i>) 17 March 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ F16K 15/14, A63B 41/00, B60C 29/00		
Applicant GLOBAL VALVE TECHNOLOGY PTY LTD et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (*sent to the applicant and to the International Bureau*) a total of 7 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box. Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input checked="" type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

Date of submission of the demand 15 October 2004	Date of completion of the report 17 July 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer VENKAT IYER Telephone No. (02) 6283 2144

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000329

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3 and 23.1 (b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
 - ☐ the international application as originally filed/furnished.
 - ☒ the description: pages **1, 5, 6, 7, 8** as originally filed/furnished
 - pages* **2** received by this Authority on **7 July 2005** with the letter of **7 July 2005**
 - pages* **2a** received by this Authority on **30 June 2005** with the letter of **30 June 2005**
 - pages **3** received by this authority on **11 November 2004** with the letter of **11 November 2004**
 - pages **4** received by this authority on **15 July 2005** with the letter of **15 July 2005**
 - ☒ the claims: pages* **9** received by this Authority on **7 July 2005** with the letter of **7 July 2005**
 - pages* **10** received by this Authority on **30 June 2005** with the letter of **30 June 2005**
 - pages* **11** received by this Authority on **15 July 2005** with the letter of **15 July 2005**
 - ☒ the drawings:
 - pages **1 - 8** as originally filed/furnished
 - pages* received by this Authority on with the letter of
 - pages* received by this Authority on with the letter of
 - ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to the sequence listing (*specify*):

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

- ☐ complied with.
- ☒ not complied with for the following reasons:

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claim 1. It is considered that the feature of the valve element including a collapsible aperture which is opened by fluid pressure alone comprises a first "special technical feature".
2. Claim 6. It is considered that the valve element being connected to the mounting member via an isolation zone that reduces likelihood of the collapsible aperture moving to the open condition under impact comprises a second special technical feature.
3. Claim 21. It is considered that the valve element being configured to provide opening of the collapsible aperture on application of a predetermined force to the mounting member comprises a third special technical feature.

Since the above-mentioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000329

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1 - 25	YES
	Claims	NO
Inventive step (IS)	Claims 1- 25	YES
	Claims	NO
Industrial applicability (IA)	Claims 1 - 25	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

None of the prior art documents cited in the International Search report or the new citations referred to in the written opinion, namely US 5320134(SINGH) 14 June 1994 and US 996588 (KENNEDY) 27 June 1911 suggest or disclose either individually or in combination the features of the valve claimed in the three independent inventions, as hereunder:

1. Claim 1 and dependent claims. The sports ball valve element including a collapsible aperture which is opened by fluid pressure alone and arranged for inflation without the use of an injector.
2. Claim 6 and dependent claims. The valve element being connected to the mounting member via an isolation zone that reduces likelihood of the collapsible aperture moving to the open condition under impact
3. Claim 21 and dependent claims. The valve element being configured to provide opening of the collapsible aperture on application of a predetermined force to the mounting member

The claims are thus considered to be novel and to involve an inventive step.

The claims are industrially applicable.

SUMMARY OF THE INVENTION

In a first aspect, the present invention provides a sports ball valve comprising:

a mounting member being adapted to provide for mounting of the valve; and

5 a valve element connected to the mounting member and being of a conical or frusto-conical shape having its reduced diameter portion directed in a forward flow direction, the valve element including a collapsible aperture located at or adjacent the reduced diameter portion and which in an open condition allows for flow of a fluid in the forward direction through the valve whilst in a closed condition the collapsible aperture prevents flow of the fluid in a reverse direction, the collapsible aperture being opened by the fluid pressure alone;

10 wherein the valve is arranged for inflation without penetrating the valve element or collapsible aperture with an injector.

Advantageously, the arrangement avoids damage to the valve element and adjoining components.

Suitably, the sports ball valve includes an isolation zone disposed intermediate the
15 mounting member and the valve element and being configured to reduce the likelihood of inadvertent opening of the collapsible aperture on application of operational forces to the mounting member. In a preferred form of the first aspect of the present invention, the isolation zone includes a peripheral recess at which the cross-sectional area of the valve is reduced. Suitably, the isolation zone is approximately 30 to 80% of the maximum cross-
20 sectional area of the conical or frusto-conical-shaped valve element.

In a second aspect, the present invention provides a valve comprising:

a mounting member being adapted to provide for mounting of the valve; and

25 a valve element connected to the mounting and being of a conical or frusto-conical shape having its reduced diameter portion directed in a forward flow direction, the valve element including a collapsible aperture located at or adjacent the reduced diameter portion and which in an open condition allows for flow of a fluid in the forward direction through the valve whilst in a closed condition the collapsible aperture prevents flow of the fluid in a reverse direction, the valve element being connected to the mounting member via an isolation zone defined by an annular recess of the valve which is configured to reduce

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likelihood of the collapsible aperture opening under application of external operational forces to the mounting member.

Suitably, the collapsible aperture of the second aspect of the present invention is arranged to open under fluid pressure alone.

5 The valve of the second aspect of the present invention may comprise another mounting member, the other mounting member being connected to the mounting member via one or more of the isolation zones or additional isolation zones which allow the mounting member and the other mounting member to move substantially independently of each other.

10 The valve element is preferably at least in part formed from a resilient material. Suitably, the isolation zone is more flexible than the valve element. The annular recess may be defined or formed by a reduction in the cross-sectional area of the valve. In a preferred form the isolation zone comprises a narrowed neck portion of the valve which joins the mounting member and valve element. The cross-sectional area of the valve at the isolation zone is preferably approximately 30 to 80% of the maximum cross-sectional area of the valve element. The isolation zone may be one of two or more isolation zones.

15 The mounting member and other mounting member may be connected to, or arranged for connection to, a mounting surface. One of the mounting surfaces may be connected to or form part of a first vessel. Another of the mounting surfaces may be connected to or form part of a second vessel.

The one or more additional isolation zones may comprise a flexible sleeve that surrounds at least in part the isolation zone of the valve element. The flexible sleeve may comprise a sleeve which is extendable and contractible in an axial direction.

20 In a third aspect, the present invention provides a valve comprising:

a mounting member being adapted to provide for mounting of the valve; and

25 a valve element connected to the mounting member and including a collapsible aperture which in an open condition allows for flow of a fluid in a forward direction through the valve whilst in a closed condition the collapsible aperture prevents flow of the fluid in a reverse direction, the valve element being configured to provide opening of the collapsible aperture on application of a predetermined axial force to the mounting member.

30 Suitably, the valve element of the second and third aspects of the present invention is of a conical or frusto-conical shape having its reduced diameter portion directed in the forward flow direction and the collapsible aperture is located at or adjacent the reduced diameter portion.

The collapsible aperture of the second and third aspects of the present invention may be arranged to receive an injector.

The mounting member of the second and third aspects of the present invention may be connected to, or arranged for connection to, an inflatable bladder.

Suitably, the mounting member is either disc-shaped or in the form of a cylinder connected to and coaxial with the conical or frusto-conical shaped valve element.

5 Suitably, application of said predetermined axial force promotes opening of the collapsible aperture for inflation of the ball. Application of said predetermined axial force to the mounting member may promote deflation of the ball.

The mounting member is preferably formed integral with the valve element so that the valve is of a one-piece construction.

10 The valve may be formed predominantly of a polymeric or rubber material.

BRIEF DESCRIPTION OF THE FIGURES

In order to achieve a better understanding of the nature of the present invention a preferred embodiment of a valve will now be described, by way of example only, with reference to the accompanying drawings which:

15 Figures 1 and 2 are cross-sectional views of a conventional sports ball valve;

Figure 3 is a side elevational, sectional and bottom view of a valve according to one embodiment of the invention;

Figure 4 is a cross-sectional view of another embodiment of a valve according to the invention;

20 Figure 5 is an elevational, sectional and inverted plan view of a further valve according to the invention;

Figure 6 is an elevational and sectional view of yet another embodiment of a valve of the invention;

CLAIMS

1. A sports ball valve comprising:

a mounting member being adapted to provide for mounting of the valve; and

a valve element connected to the mounting member and being of a conical or frusto-
5 conical shape having its reduced diameter portion directed in a forward flow direction, the
valve element including a collapsible aperture located at or adjacent the reduced diameter
portion and which in an open condition allows for flow of a fluid in the forward direction
through the valve whilst in a closed condition the collapsible aperture prevents flow of the
fluid in a reverse direction, the collapsible aperture being opened by the fluid pressure alone
10 wherein the valve is arranged for inflation without penetrating the valve element or
collapsible aperture with an injector.
2. A sports ball valve as claimed in claim 1 wherein the valve includes an isolation zone
disposed intermediate the mounting member and the valve element and being configured to
reduce the likelihood of inadvertent opening of the collapsible aperture on application of
15 operational forces to the mounting member.
3. A sports ball valve as claimed in claim 2 wherein the isolation zone includes a
peripheral recess at which the cross-sectional area of the valve is reduced.
4. A sports ball valve as claimed in either claims of 2 or 3 wherein the isolation zone is
approximately 30 to 80% of the maximum cross-sectional area of the conical or frusto-
20 conical-shaped valve element.
5. A sports ball valve as claimed in any one of the preceding claims wherein the
mounting member is either disc-shaped or in the form of a cylinder connected to and coaxial
with the conical or frusto-conical shaped valve element.
6. A valve comprising:

25 a mounting member being adapted to provide for mounting of the valve; and

a valve element connected to the mounting and being of a conical or frusto-conical
shape having its reduced diameter portion directed in a forward flow direction, the valve

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element including a collapsible aperture located at or adjacent the reduced diameter portion and which in an open condition allows for flow of a fluid in the forward direction through the valve whilst in a closed condition the collapsible aperture prevents flow of the fluid in a reverse direction, the valve element being connected to the mounting member via an isolation zone defined by an annular recess of the valve which is configured to reduce the likelihood of the collapsible aperture opening under application of external operational forces to the mounting member.

7. A valve as claimed in claim 6 wherein the collapsible aperture is arranged to open under fluid pressure alone.

8. A valve as claimed in claim 6 wherein the collapsible aperture is arranged to receive an injector.

9. A valve as claimed in any one of claims 6 to 8 wherein the valve element is at least in part formed from a resilient material.

10. A valve as claimed in claim 9 wherein the isolation zone is more flexible than the valve element.

11. A valve as claimed in any one of claims 6 to 10 wherein the annular recess is defined or formed by a reduction in the cross-sectional area of the valve.

12. A valve as claimed in any one of claims 6 to 11 wherein the isolation zone comprises a narrowed neck portion of the valve which joins the mounting member and the valve element.

13. A valve as claimed in either of claims 11 or 12 wherein the cross-sectional area of the valve at the isolation zone is approximately 30 to 80% of the maximum cross-sectional area of the valve element.

14. A valve as claimed in any one of claims 6 to 13 wherein the isolation zone is one of two or more isolation zones.

15. A valve as claimed in any one of claims 6 to 14 comprising another mounting member, the other mounting member being connected to the mounting member via one or more of the isolation zones or additional isolation zones which allow the mounting member and other mounting member to move substantially independently of each other.

16. A valve as claimed in claim 15 wherein the mounting member and other mounting member are connected to, or arranged for connection to, a mounting surface.
17. A valve as claimed in claim 16 wherein one of the mounting surfaces is connected to or forms part of a first vessel.
- 5 18. A valve as claimed in claim 17 wherein another of the mounting surfaces is connected to or forms part of a second vessel.
19. A valve as claimed in any one of claims 15 to 18 wherein the one or more additional isolation zones comprise a flexible sleeve that surrounds at least in part the isolation zone of the valve element.
- 10 20. A valve as claimed in claim 19 wherein the flexible sleeve comprises a sleeve which is extendable and contractible in an axial direction.
21. A valve comprising:
a mounting member being adapted to provide for mounting of the valve; and
a valve element connected to the mounting member and including a collapsible
15 aperture which in an open condition allows for flow of a fluid in a forward direction through the valve whilst in a closed condition the collapsible aperture prevents flow of the fluid in a reverse direction, the valve element being configured to provide opening of the collapsible aperture on application of a predetermined axial force to the mounting member.
22. A valve as claimed in claim 21 wherein application of the predetermined axial force
20 to the mounting member promotes opening of the collapsible aperture.
23. A valve as claimed in any one of the preceding claims wherein the mounting member is formed integral with the valve element so that the valve is of a one-piece construction.
24. A valve as claimed in any one of claims 21 to 23 wherein the valve element is of a conical or frusto-conical shape having its reduced diameter portion directed in the forward
25 flow direction and the collapsible aperture is located at or adjacent the reduced diameter portion.
25. A valve as claimed in any one of the preceding claims formed predominantly of a polymeric or rubber material.